TRADITIONAL RICE VARIETIES OF NORTH GOA: BIODIVERSITY, THREATS AND CONSERVATION STRATEGIES

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ABSTRACT Traditional rice varieties of North Goa (Goa) represents important genetic reservoirs with valuable traits. These traditional varieties are better adapted to local soil and climatic conditions, resistance to diseases, withstands water stress, has good grain characteristics and nutritional value. Such traits act as positive factors in the retention of these rice varieties in the face of increasing erosion of these important germ plasm of rice. Its conservation is crucial for future food security. Recently the cultivation of these varieties is on the decline. The present study aims to assess the biodiversity status of the traditional rice varieties in North Goa, to identify the factors responsible for the change in its biodiversity status and to recommend conservation strategies if needed.

KEYWORD Conservation; Biodiversity; Gene pool; Trait; Rice varieties

INTRODUCTION

In India about 70% of people consume rice (*Oryza sativa)* as staple food and it is cultivated in an area of about 42 million hectares with on annual production of about 100 million tonnes (The Hindu Survey of India Agriculture 2010). Goa a small state of the West coast of India harbours genetically rich traditional rice varieties. These traditional varieties are unique gene pools since they are known to be salinity tolerant, disease and pests resistant, having good grain characteristic and nutritional value besdides they are known to be sturdier to changing soil and climatic conditions (Manjunath et al 2009). In recent years various threats and pressures are endangering this unique traditional rice varieties. Several varieties are on the verge of extinction (Kamat 2011). It is therefore desirable if such useful strains could be utilized for various breeding programme and biotechnological research. The recognition of non- sustainability in chemical farming creates a new relevance for traditional crops and indigenous agricultural practices (Bhonsle and Krishnan 2010). As the genetic base of modern rice cultivation is narrow and is vulnerable to pests and diseases. Hence conservation of these traditional varieties is crucial for future food security (Bhonsle and Krishnan 2011). The objective of the present study is to identify the various threats endangering these varieties and to recommend conservation strategies.

METHODOLOGY Goa a small State (3702 sq. ft) on the West Coast of India comprises of 11 talukas surrounded by the state of Maharashtra to the North, Karnataka to the East and South the Arabian sea on the West. Goa is located between 15 48' North, 14 53' North latitude and 74 20' east, 73 40'longitude. The state extends to a length of 105Kms from north to south and 60Kms wide from east to west. Along coastal plains, cultivated fields and Khazans are common. Being in the tropical zone and near the Arabian sea, Goa has a hot and humid climate most of the year. Goa receives average rainfall of 2000mm – 3000 mm during the monsoon period. Humidity usually ranges between 70-80%. Soil type of Goa predominatly includes laterites (73.4%) alluvial and marshy (11.7%) coastal sandy soils (10.11%) saline soils 4.79%. Rice is cultivated in three different types of land, the morod (upland), the kherlands (sandyloam midlands) and khazanlands (saline lands). The study sites included all the 6 talukas in North Goa- Tiswad, Bardez, Pernem, Bicholim, Satari and Ponda. Primary and secondary data were used for this study. Primary data is related

with the interview of the farmers. Sources of secondary data used here are from the Agriculture Department (Goa Govt), ICAR and NGOs. Field surveys were done from June to August.

RESULT AND DISCUSSIONS

Present study showed that the traditional rice biodiversity is depleting at an alarming rate. In **Table 1**. It is observed that from 17 commonly grown traditional rice varieties only 3 were found cultivated presently. The cultivated percentage of these traditional varieties was extremely low. (Kochri - 8%, Korgut - 4%, Babri -1%). In **Fig 1.** It is seen that the introduced varieties i.e Jaya and Jyoti formed 87% of the cultivation compared to the traditional varieties. Eight five percent of the locals attributed the loss of the traditional rice biodiversity to the shift in occupation from agriculture to other tertiary sectors. A number of people have migrated out of the state for livelihood, for better opportunities and higher income and this has led to non availability of labour. The hired labour is scarce and costly. Similar observations were recorded by Jose et al. (2016). Thus locals find it economically more feasible and profitable to purchase rather than cultivate.

Due to heavy pressure on land, Goa is fast turning into a preferred residential and holiday destination. The most serious aspect of agriculture in Goa is the thoughtless conversion of agricultural land to non-agricultural purpose. According to Rajukannu et al. (2009) traditional rice varieties in India and across Asia are under severe threat of extinction due to arrival of modern high yielding rice varieties. In our study it was also observed that equal percentage of farmers attributed the decline in cultivation of the traditional varieties due to monocultures (2 to 3 high yielding varieties) like Jaya and Jyoti. The major impact of this is felt by the gene pool of the traditional varieties.

In the present study it was seen that there are no policies, schemes or incentives to conserve the germplasm of traditional rice varieties. It was seen that the seeds of the traditional varieties are difficult to find hence not easily available . The biodiversity of these are maintained by few individuals who inturn provide these for sale in market. It has been obvious throughout this survey that the conservation of the traditional biodiversity is a neglected frontier which deserves attention. Hence the need of the hour is to take urgent action to protect these unique traditional rice varieties which are depleting at an alarming rate.

A sustained propaganda needs to be done by the agricultural dept of Goa. Most of the framers are not aware of the existing scheme because it is only in print and no publicity is given by the government. The authorities should create awareness among farmers. Also all possible scientific and technical support should be made available.Attractive Schemes, incentives towards cultivation of traditional varieties needs to be introduced along with various policies on making rice farming a remunerative vocation. Establishment of seed banks is the need of the hour.Various environmental and biodiversity awareness programmes need to be conducted at several levels. More focus should be laid upon impressing young minds that farming is a remunerative vocation and not one which should be looked down upon.

CONCLUSION- The present study shows that the biodiversity of traditional rice varieties is depleting at an alarming rate due to the replacement of traditional varieties with monocultures of the introduced high yielding varieties, economic rationality where people find agriculture as non profitable and non economical and urbanization. Since these traditional rice varieties represent important genetic reservoirs with valuable traits as they are known to be salinity tolerant, disease and pests resistant and having good nutritional value. There is an urgent need to provide proper incentives and encourage farmers to cultivate these varieties, which will to help in the *insitu* conservation of this important gene pool. This could be utilized for various future breeding programmes and can be exploited for the improvement of rice varieties.

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Table 1. Cultivation status of the traditional Rice varieties in the past and present.

Traditional Rice Varieties	Rice Varieties Cultivated in the Past	Present Cultivation Status
Damgo	+	-
Babri	+	+
Dodig	+	-
Khochri	+	+
Patni	+	-
Korgut	+	+
Asgo	+	-
Kendal	+	-
Xitto	+	-
Nermar	+	-
Mudgo	+	-
Sotti	+	-
Shirdi	+	-
Belio	+	-
Munno	+	-

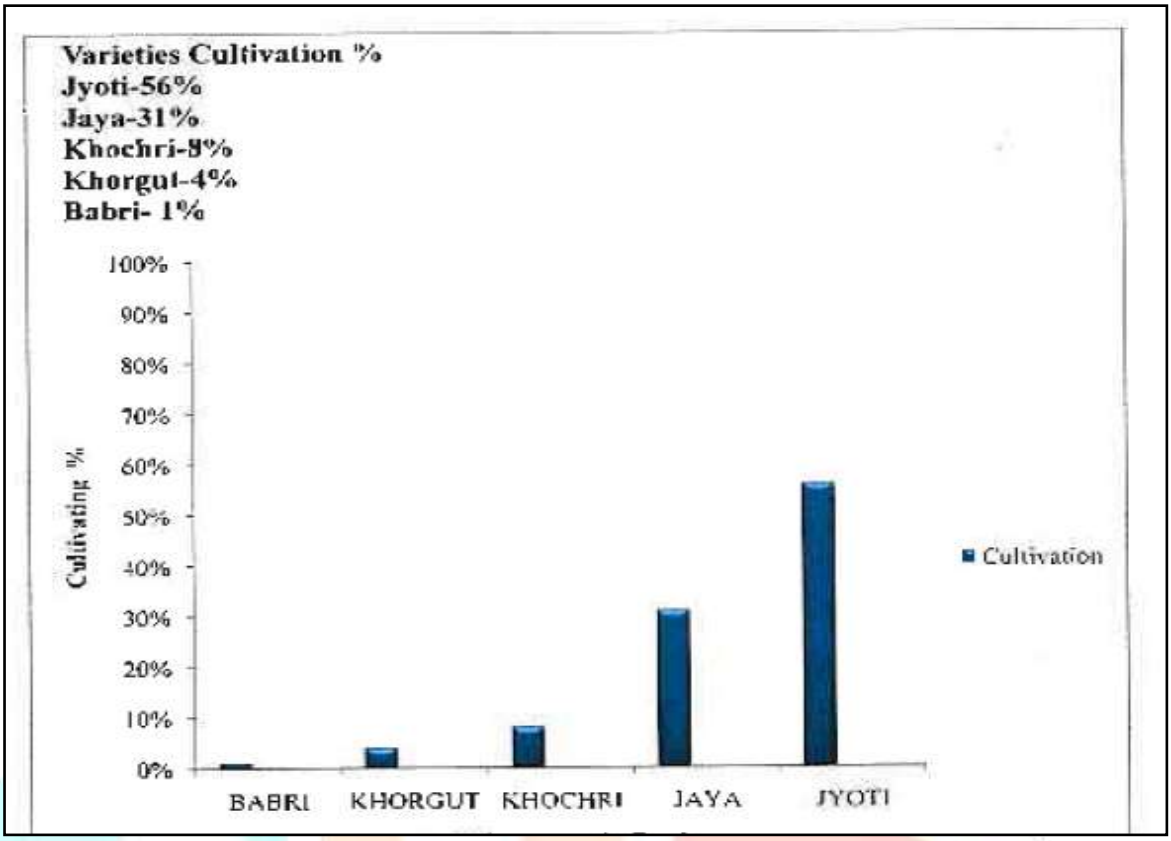

Figure 1: Cultivation percentage of introduced varieties and the traditional varieties in North Goa.